

A new species of the genus *Filientomon* from central Japan (Protura: Acerentomidae)

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Abstract A new species of the proturan genus *Filientomon*, *F. gentaroanum* sp. nov., is described from central Japan. The present species is similar to *F. lubricum* from western Japan, but the former is distinguished from the latter by the shape of dorsal accessory setae on abdomen II–VI, the shape and relative length of foretarsal sensilla *a*, and the position and relative length of foretarsal sensilla *d*.

Key words: Protura, new species, *Filientomon*, central Japan

This paper is dedicated to the late Prof. Gentaro IMADATÉ, who facilitated the development of Proturan studies in Japan and the world.

Among the *Filientomon*-species, only *F. lubricum*, of which the distribution range is restricted to western Japan, has six pairs of anterior setae on abdominal tergites II–VI. In the course of proturan faunistic surveys of central Japan, however, another form of this genus with the same number of pairs of anterior setae has been collected from several places of Ibaraki and Tochigi Prefectures. Close examination revealed that these specimens all are of the same species and new to science, as given in the following lines.

Filientomon gentaroanum sp. nov.
(Figs. 1–18)

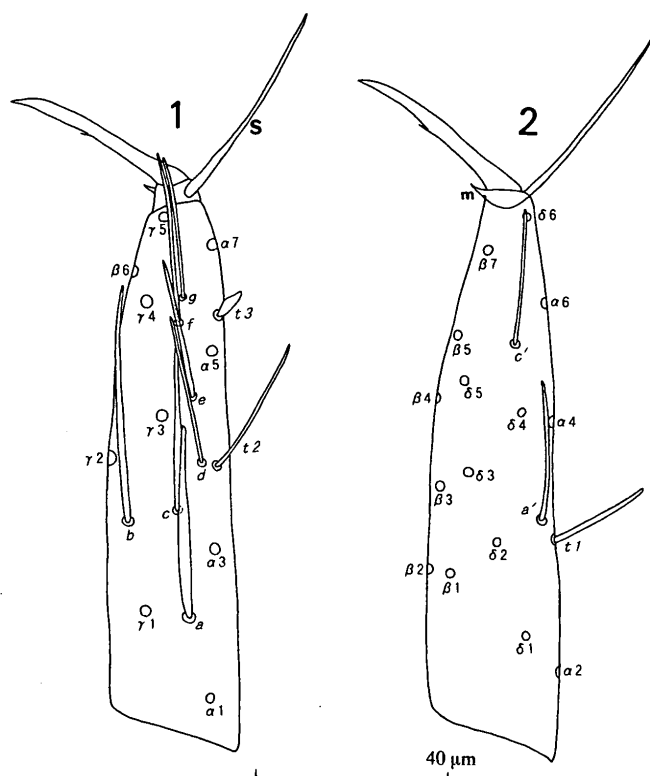
Body length: 1400 μm at maximum.

Head: 139–165 μm \times 102–113 μm in dorsal view, with additional setae *a* (Fig. 3); rostrum poorly protruded (Fig. 4). A median pore present (arrow in Fig. 3). Maxillary palpus with two sensillae on penultimate segment, dorsal sensilla *d* and ventral sensilla *v*, subequal to each other in both shape and length (8–9 μm) (Fig. 5). Praelabium with fringes *f* at base of distal setae, and an indistinct row of minute tubercles *t* along median edge (Fig. 6). Labial palpus apically ornamented with a tuft of setae, with three setae and a sensilla *s* (Fig. 6). Pseudoculus slightly broader than long (Fig. 7), 9–11 μm

\times 10–13 μm , PR (the length of the head behind the rostral setae divided by the length of the pseudoculus) = 14–18. Canal of maxillary gland simple (Fig. 8).

Legs: Foretarsus 103–119 μm ; claw 38–44 μm , with an inner flap, TR (the ratio of foretarsal length to the length of claw) = 2.7–2.9; empodium *m* 4–6 μm , EU (the ratio of the length of the empodium to the length of claw) = 0.1–0.16; S-shaped seta *S* 39–45 μm , slightly longer than or almost as long as claw (Figs. 1 and 2). Dorsal sensilla *t1* filiform, BS (the ratio of the distance between the proximal end and sensilla *t1* to the distance between *t1* and the praetarsus) = 0.6–0.7; *t2* thin; *t3* small and lanceolate. Exterior sensilla *a* broad and surpassing base of *d*; *b* long, thick and surpassing base of γ ; *c* slightly thick and surpassing base of *e*; *d* at same level as *t2* and situated halfway between *c* and *e*, or slightly near to *c*, and reaching base of *f*; *e* surpassing base of *g*; *f* and *g* close to each other, and both apices surpassing tarsus. Interior sensilla *a'* thin and a little distal to *t1*; *b'* absent; *c'* reaching base of δ . Middle tarsus 48–55 μm , its claw 23–25 μm ; hind tarsus 58–59 μm , its claw 22–26 μm .

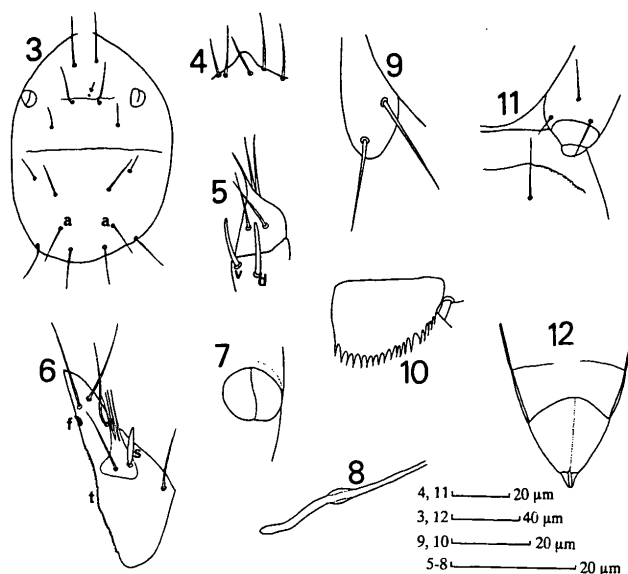
Body: Chaetotaxy as in Table 1 and Figs. 13–18. Abdominal tergites II–VI each with six pairs of anterior setae, A1, 1', 2, 3, 4 and 5; VII also with six pairs, A1, 2, 3, 4, 4' and 5; P1a, 2a, 3a and 4a on II–VII present. Sternite VIII with a single row of four setae. P5a on thoracic tergites II and III minute and rudimentary, respectively; other dorsal accessory setae on thorax and abdomen I–VII all seta-like and longer than 1/3 of P1.



Figs. 1–2. Foretarsus of *Filientomon gentaroanum* sp. nov., holotype. 1, interior view; 2, exterior view. Signs: m, empodium; S, S-shaped seta.

Integumental pores distinct (Figs. 13–18). Thoracic tergite II with two pairs of pores, of which one is between A3 and P2a and the other posterior to A4; III with a pair of pores between A3 and P2a; sternites II and III with some pores posterior to Ac. Abdominal tergites II–VI with a pair of pores anterolateral to P1a; VII with two pairs of pores, one being anterolateral to P1a and the other anterior to P3a; II–VII with a pair of anterolateral pores (Fig. 16); VIII with a pair of pores between M2 and M3 with small pectines; XII with a single central pore. Sternites II–III with a single pore anterior to Pc; IV with one or two pores anterolateral to one of P1; V–VI with a pore anterolateral to P1a.

Abdominal appendages II and III each with two setae, the apical seta longer than 2/3 of subapical one (Fig. 9). On abdomen VIII, scattered granules present in anterior portion (Figs. 17 and 18); striate band developed (Figs. 17 and 18); posterior margin of comb rounded and protruded distinctly backward, with about 20 teeth (Fig. 10). Abdomen II–VII with one or two anterior lines; on sternites II–VII minute pectinate structure visible in a lateral part of a line (Fig. 11); hind margin of sternite XII



Figs. 3–12. *Filientomon gentaroanum* sp. nov., holotype. 3, head; 4, rostrum; 5, maxillary palpus; 6, praelabium; 7, pseudoculus; 8, canal of maxillary gland; 9, abdominal appendage III; 10, comb on abdomen VIII; 11, minute pectinate structure on abdominal sternite II; 12, female squama genitalis. Signs: a, additional seta; d, dorsal sensilla; f, fringes; t, tubercles; v, ventral sensilla. Arrow shows a median pore.

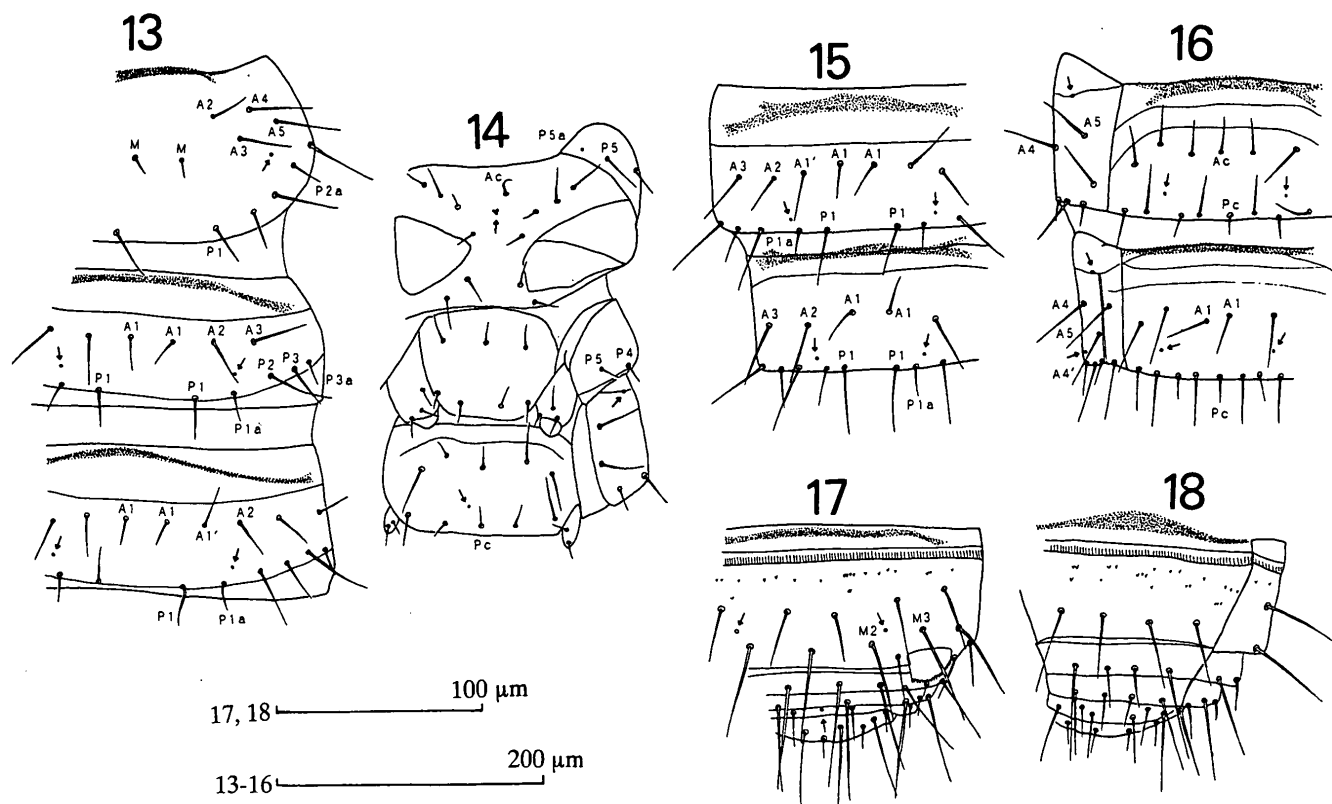
with micro-teeth. Female squama genitalis with pointed acrostylus (Fig. 12). Male normal.

Holotype: ♀ (NSMT-Ap 360), Mt. Nandai, Yasato-machi, Ibaraki Pref., central Japan, 500 m alt., 20-VI-1998, H. SAKAYORI *et al.* leg.

Paratypes: 1 ♀ (NSMT-Ap 361), same data as for holotype; 1 ♂ (NSMT-Ap 362), Kamiakasawa, Nanakai-mura, Ibaraki, 250 m alt., 7-IX-1997, H. SAKAYORI *et al.* leg.; 1 ♂ 1 ♀, Ogamido, Takahagi-shi, Ibaraki, 540 m alt., 3-VII-1988, K. ISHII *et al.* leg.; 1 ♀ (IV 4522), Takatoku, Fujiwara-machi, Tochigi, 460 m alt., 2-XI-1998, K. FURUNO *et al.* leg.; 2 ♀ (NSMT-Ap 363 & IV 4523), Nakaii, Motegi-machi, Tochigi, 270 m alt., 7-VI-1997, K. FURUNO *et al.* leg.; 1 ♀ (IV 4524), Sukagawa, Kurobane-machi, Toichigi, 240 m alt., 12-XII-1998, K. FURUNO *et al.* leg.

Holotype (NSMT-Ap 360) and a part of paratypes (NSMT-Ap 361–363) are deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo, another part of paratypes (IV 4522–4524) in Tochigi Prefectural Museum, Utsunomiya, Tochigi and the remaining paratypes in my collection.

Further specimens examined: 4 ♀, 1 matusus junior



Figs. 13–18. *Filientomon gentaroanum* sp. nov., holotype. 13, dorsal view of thorax III–abdomen II; 14, ventral view of thorax III–abdomen II; 15, dorsal view of abdomen VI–VII; 16, ventral view of abdomen VI–VII; 17, dorsal view of abdomen VIII–XII; 18, ventral view of abdomen VIII–XII. Arrows indicate integumental pores.

(mj), Yanagisawa, Takahagi-shi, Ibaraki, 740 m alt., 19-VI-1988, H. TAMURA *et al.* leg.; 1 ♀, Yonedaira, Takahagi-shi, Ibaraki, 450 m alt., 23-X-1988, H. TAMURA *et al.* leg.; 2 ♂, 6 ♀, 1 preimago ♂ (p ♂), same data as for paratype from Ogamido; 2 ♀, 1p ♂, 1 mj, Yokokawa, Takahagi-shi, Ibaraki, 280 m alt., 4-VI-1989, H. TAMURA *et al.* leg.; 2 ♂, 1 ♀, 2p ♂, 1 Larva I (LI), same data as for paratype from Kamiakasawa; 1 ♂, Mt. Nandai, Yasato-machi, Ibaraki, 460 m alt., 20-VI-1988, H. SAKAYORI *et al.* leg.; 2 ♂, 1 ♀, 1p ♂, 3mj, 4 Larva II, 3LI, same data as for holotype; 1 ♂, 1 ♀, Yorii, Nasu-machi, Tochigi, 470 m alt., 16-X-1994, K. FURUNO *et al.* leg.; 1 ♂, 2 ♀, Mt. Akanagi, Nikko-shi, Tochigi, 1915 m alt., 21-IX-1996, K. FURUNO *et al.* leg.; 1 ♂, 3 ♀, 1LI, same data as for paratypes from Nakaii; 1 ♀, same data as for paratype from Sukagawa; 6 ♂, 3 ♀, 1p ♂, Koguchi, Batomachi, Tochigi, 200 m alt., 12-XII-1998, K. FURUNO *et al.* leg.

Preimago: Body length 988 μm at maximum, head 128–137 μm, pseudoculus 7.4–9.6 μm × 8.5 μm, PR = 14–16. Foretarsus 86–88 μm, claw 30–33 μm, TR = 2.7–

2.9, EU = 0.14–0.16, BS = 0.60–0.65. Middle tarsus 38–47 μm, claw 17–20 μm; hind tarsus 43–47 μm, claw 18–22 μm. Fundamental features almost the same with those of imagines.

Maturus junior: Body length 878 μm at maximum, head 139–150 μm, pseudoculus 9.2–10.5 μm × 7.6–8.6 μm, PR = 13–15. Position and shape of foretarsal sensillae almost the same with those of imagines. Foretarsus 83–86 μm, claw 30–34 μm, TR = 2.8, EU = 0.1–0.13, BS = 0.57–0.58. Middle tarsus 40–48 μm, claw 20–22 μm; hind tarsus 46–50 μm, claw 21–24 μm.

Larva II: Body length 780 μm at maximum, head 126–134 μm, pseudoculus 7.9–9.8 μm × 7.9–8.6 μm, PR = 13–16. Foretarsus 74–79 μm, claw 29–30 μm, TR = 2.5–2.7, EU = 0.11–0.14, BS = 0.55–0.63. Inner flap of claw indistinct. Middle tarsus 36–38 μm, claw 18–19 μm; hind tarsus 41–45 μm, claw 20–21 μm.

Larva I: Body length 650 μm at maximum, head 106–115 μm, pseudoculus 7.2–7.6 μm × 6.5–7.9 μm, PR = 14–16. Foretarsus 53–65 μm, claw 24–27 μm, TR = 2.2–2.6, EU = 0.13–0.14, BS = 0.54–0.58. Interior

Table 1. Chaetotaxy of *Filientomon gentaroanum* sp. nov.

		Larva I		Larva II		Maturus junior		Imago	
		Formula	Primary setae	Formula	Secondary setae	Formula	Tertiary setae	Formula	Complementary setae
(Dorsal)									
Thorax	I	4	1, 2	4		4		4	
	II	4	A2, M	6	A4	8	A3	8	
		10	P1, 2, 3, 4, 5a	14	P1a, 5	16	P2a	16	
	III	4	A2, M	6	A4	10	A3, 5	10	
		10	P1, 2, 3, 4, 5a	14	P1a, 5	16	P2a	16	
	I	0		2	A1	6	A2, 3	6	
		8	P1, 2, 3, 4	12	P3a, 5	14	P1a	14	
	II-VI	0		2	A1	10	A2, 3, 4, 5	12	A1'
		10	P1, 2, 3, 4, 5	14	P2a, 4a	16	P1a	18	P3a
	VII	0		4	A1, 4	10	A2, 3, 5	12	A4'
		10	P1, 2, 3, 4, 5	16	P1a, 2a, 4a	18	P3a	18	
	VIII	0-4	M2, 3	2-7	A3, Mc, 4	6-7	A1, 5	8-7	A2
		8	P2, 3, 4, 5	8		8		8	
Abdomen	IX			8	1, 3, 4, 5	10	3a	14	2, 4a
	X					8	1, 3, 4, 5	10	3a
	XI					6	1, 2, 3	6	
	XII	9	c, 1, 2, 3	9		9		9	
(Ventral)									
Thorax	I	2-2	A1, M1	2-2		4-2	A2	4-4	
		4	P1, 2	4		6	P3	6	
	II	3-2	Ac, 2, M	5-2	A3	5-2		5-2	
Abdomen	II	2	P1	2		4	P2	4	
	III	3-2	Ac, 2, M	5-2	A3	7-2	A4	7-2	
		2	P1	2		4	P2	4	
	I	0		3	Ac, 2	3		3	
		2	P1	2		4	P2	4	
	II-III	1	Ac	1		3	A2	5	A3
		2	P2	5	Pc, 3	5		5	
	IV-V	1	Ac	1		4 (3)	(-Ac, +A1), A2	6	A3
		4	P1, 2	8	P1a, 3	8		8	
	VI	1	Ac	1		4	(-Ac), A1, 2	7	+Ac, 3
		4	P1, 2	8	P1a, 3	8		9	Pc
	VII	1	Ac	1		4	(-Ac), A1, 2	6 (5)	(+Ac, -A1), A3
		4	P1, 2	8	P1a, 3	8		9	Pc
	VIII	2	1	4	2	4		4	
		0		0		0		0	
	IX			4	1, 2	4		4	
	X					4	1, 2	4	
	XI					2	2	6	1, 3
	XII	8	A, 1, 2, 3	8		6	-A	6	

sensilla c' absent. Middle tarsus 24–28 μm , claw 16–18 μm ; hind tarsus 32–39 μm , claw 17–18 μm .

Etymology: This species is named after the late Prof. Gentaro IMADATÉ, who was one of the greatest authorities on Protura.

Remarks: The present species is similar to *F. lubricum* (IMADATÉ, 1956) (cf. IMADATÉ, 1974) from western part of Japan, both species being distinguishable from the other congeneric species by possessing six pairs of anterior setae (A_1 , $1'$, 2, 3, 4 and 5) on abdominal tergites II–VI. However, this new species is distinctly different from *F. lubricum* in the shape and length of dorsal accessory setae on abdomen II–VI (short and sensilla-like in *lubricum*), the shape and relative length of foretarsal sensilla a (thin and not surpassing base of d in *lubricum*), and the position and relative length of foretarsal sensilla d (distal to t_2 and not reaching base of e in *lubricum*).

Notes: Small teeth accompanying with pore on abdomen VIII are sometimes indistinct. Minute pectinate structure in a lateral part of an anterior line on sternites II–VII is often vague.

Some chaetotaxal abnormalities are observed. Asymmetric absence of A_2 and P_{3a} on abd. terg. II, P_{1a} on VI, A_4 on VII was observed in one female from Mt. Nandai; symmetric absence of P_{1a} on abd. terg. I, asymmetric absence of A_3 on thoracic terg. II–III, A_1 , 2 and 3 on abd. terg. I, A_3 on II, IV and VI, A_1 and 2 on VII, P_{1a} on II, P_{3a} on II–VI, P_2 on abd. stern. I and A_3 on stern. VII in 3 maturi juniores from Mt. Nandai; asymmetric absence

of A_2 on abd. terg. II–IV and P_{3a} on abd. terg. I in one Larva II from Mt. Nandai.

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摘 要

中村修美 (埼玉県立自然史博物館 〒369-1305 埼玉県秩父郡長瀨町長瀨1417) : 関東地方から採集されたタカナワカマアシムシ属の一新種

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茨城県と栃木県から採集されたタカナワカマアシムシ属の一新種を *Filientomon gentaroanum* sp. nov. トウゴクカマアシムシ (新称) と命名し、記載した。本種は *F. lubricum* (IMADATÉ, 1956) サイカイカマアシムシとともに、第2–6腹節背板に6対の前列毛を有することで同属他種と区別される。しかし、本種は第2–6腹節背板の副毛の形態、前肢感覚毛 a および d の位置と長さの違いにより、*F. lubricum* と区別される。

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